

Application number 10/630,598
Amendment dated January 14, 2005
Reply to office action mailed July 14, 2004

PATENT

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings of claims in the application:

Listing of Claims:

Claim 1 (currently amended) A method of forming an integrated circuit comprising:
providing a first diffusion region, the first diffusion region forming a source/drain region of a first transistor;
providing a second diffusion region, the second diffusion region forming a source/drain region of a second transistor;
providing an isolation region between the first and second diffusion regions; and
selectively implanting a first channel stop implant region and a second channel stop implant region in the isolation region, wherein the first channel stop implant region is separate from the second channel stop implant region.

Claim 2 (original) The method of claim 1 wherein the first channel stop implant region and the second channel stop implant region define at least a portion of an isolation conductive path between the first diffusion region and the second diffusion region.

Claim 3 (original) The method of claim 2 wherein a separation distance between the first channel stop implant region and the second channel stop implant region is chosen to control a voltage threshold of an isolation region transistor, the isolation region transistor formed by the first diffusion region, the second diffusion region, and the isolation region.

Claim 4 (original) The method of claim 3 wherein when the separation distance between the first channel stop implant and second channel stop implant is reduced, the threshold voltage is increased.

Application number 10/630,598
Amendment dated January 14, 2005
Reply to office action mailed July 14, 2004

PATENT

Claim 5 (original) The method of claim 2 further comprising a third diffusion region, wherein the first channel stop implant region and the second channel stop implant region form at least a part of an isolation conductive path between the first diffusion region, the second diffusion region, and the third diffusion region.

Claim 6 (original) The method of claim 5 wherein the third diffusion region is coupled to a ground pad.

Claim 7 (original) The method of claim 2 further comprising providing a field oxide region over the isolation region.

Claim 8 (original) The method of claim 7 further comprising providing a gate over the field oxide region, wherein when a threshold voltage is applied to the gate, current flows in the isolation conductive path.

Claim 9 (original) The method of claim 7 wherein the first diffusion region, second diffusion region, and isolation region form a isolation region transistor, and the isolation region transistor is used in as an electro-static discharge protection device.

Claim 10 (original) The method of claim 9 wherein the first diffusion region, second diffusion region, and isolation region form a isolation region transistor, and the isolation region transistor is used in a charge pump circuit.

Claim 11 (original) A method of forming an integrated circuit comprising:

- growing a pad oxide layer on a substrate;
- growing a silicon nitride layer on the pad oxide;
- etching a first isolation region and a second isolation region from the silicon nitride layer and the pad oxide layer;
- depositing a spacer oxide;

Application number 10/630,598
Amendment dated January 14, 2005
Reply to office action mailed July 14, 2004

PATENT

etching the spacer oxide to form a first opening and a second opening in the first isolation region, and a third opening in the second isolation region;

implanting a first channel stop implant region in the first opening and a second channel stop implant region in the second opening in the first isolation region, and a third channel stop region in the third opening in the second isolation region;

removing the remaining spacer oxide;

growing a field oxide in the first isolation region and the second isolation region;

removing the silicon nitride layer;

depositing a polysilicon layer;

etching the polysilicon layer; and

implanting a plurality of diffusion regions.

Claim 12 (original) The method of claim 11 wherein the etched polysilicon layer comprises a first gate region over the first isolation region and a second gate region over the second isolation region.

Claim 13 (original) The method of claim 12 wherein the first channel stop region and the second channel stop region form at least a part of an isolation conductive path between a first diffusion region and a second diffusion region, wherein the first diffusion region and the second diffusion region are two of the plurality of diffusion regions.

Claim 14 (original) The method of claim 13 wherein the first diffusion region and the second diffusion region are at least partly defined by the first isolation region, and the plurality of diffusion regions further includes a third diffusion region and a fourth diffusion region, where the third diffusion region and the fourth diffusion region are at least partly defined by the second isolation region, and

wherein current flows between the first diffusion region and the second diffusion region at a first threshold voltage, and between the third diffusion region and the fourth diffusion region at a second threshold voltage, the first threshold voltage less than the second threshold voltage.

Application number 10/630,593
Amendment dated January 14, 2005
Reply to office action mailed July 14, 2004

PATENT

Claim 15 (currently amended) A method of forming an integrated circuit comprising:

- providing a first diffusion region, the first diffusion region forming a source/drain region of a first transistor;
- providing a second diffusion region, the second diffusion region forming a source/drain region of a second transistor;
- providing a third diffusion region;
- providing an isolation region between the first, second and third diffusion regions;

and

selectively implanting a first channel stop implant region, a second channel stop implant region, and a third channel stop implant region in the isolation region, wherein the first channel stop implant region, the second channel stop region, and the third channel stop region are separate from each other.

Claim 16 (original) The method of claim 15 wherein the first channel stop implant region, the second channel stop implant region, and the third channel stop implant region define at least a portion of an isolation conductive path among the first diffusion region, the second diffusion region, and the third diffusion region.

Claim 17 (original) The method of claim 16 wherein a separation distance between the first channel stop implant region and the second channel stop implant region is chosen to control a voltage threshold of an isolation region transistor formed by the first diffusion region, the second diffusion region, the third diffusion region, and the isolation region.

Claim 18 (original) The method of claim 17 wherein the third diffusion region is coupled to a ground pad.

Claim 19 (original) The method of claim 17 further comprising:
providing a field oxide region over the isolation region.

Claim 20 (original) The method of claim 19 further comprising:

Application number 10/630,598
Amendment dated January 14, 2005
Reply to office action mailed July 14, 2004

PATENT

providing a gate over the field oxide region, wherein when the threshold voltage is applied to the gate, current flows among the first diffusion region, the second diffusion region, and the third diffusion region.